SLOVENSKI STANDARD
SIST EN 12953-1:2012

01-maj-2012

Nadomešča:
SIST EN 12953-1:2002

Mnogovodni kotli - 1. del: Splošno

Shell boilers - Part 1: General

Großwasserraumkessel - Teil 1: Allgemeines

Chaudières à tubes de fumée - Partie 1: Généralités

Ta slovenski standard je istoveten z: EN 12953-1:2012

ICS:

27.060.30	Grelniki vode in prenosniki toplote	Boilers and heat exchangers

SIST EN 12953-1:2012 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12953-1

March 2012

ICS 27.060.30

Supersedes EN 12953-1:2002

English Version

Shell boilers - Part 1: General

Chaudières à tubes de fumée - Partie 1: Généralités

Großwasserraumkessel - Teil 1: Allgemeines

This European Standard was approved by CEN on 7 January 2012.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword

This document (EN 12953-1:2012) has been prepared by Technical Committee CEN/TC 269 “Shell and water-tube boilers”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2012, and conflicting national standards shall be withdrawn at the latest by September 2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12953-1:2002.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

Annex D provides details of significant technical changes between this European Standard and the previous edition.

The European Standard EN 12953 concerning shell boilers consists of the following parts:

— *Part 1: General*;

— *Part 2: Materials for pressure parts of boilers and accessories*;

— *Part 3: Design and calculation for pressure parts*;

— *Part 4: Workmanship and construction of pressure parts of the boiler*;

— *Part 5: Inspection during construction, documentation and marking of pressure parts of the boiler*;

— *Part 6: Requirements for equipment for the boiler*;

— *Part 7: Requirements for firing systems for liquid and gaseous fuels for the boiler*;

— *Part 8: Requirements for safeguards against excessive pressure*;

— *Part 9: Requirements for limiting devices of the boiler and accessories*;

— *Part 10: Requirements for feedwater and boiler water quality*;

— *Part 11: Acceptance tests*;

— *Part 12: Requirements for grate firing systems for solid fuels for the boiler*;

— *Part 13: Operating instructions;*

— *CR 12953 Part 14: Guideline for involvement of an inspection body independent of the manufacturer.*

Although these parts may be obtained separately, it should be recognized that the parts are interdependent. As such, the design and manufacture of shell boilers requires the application of more than one part in order for the requirements of the European Standard to be satisfactorily fulfilled.

For any questions arising when using these standards the Boiler Helpdesk of CEN/TC 269 may be contacted:

http://www.boiler-helpdesk.din.de

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

1.1 General

This European Standard applies to shell boilers with volumes in excess of 2 litres for the generation of steam and/or hot water at a maximum allowable pressure greater than 0,5 bar and with a temperature in excess of 110 °C.

The purpose of this European Standard is to ensure that the hazards associated with the operation of shell boilers are reduced to a minimum and that adequate protection is provided to contain the hazards that still prevail when the shell boiler is put into service. This protection will be achieved by the proper application of the design, manufacturing, testing and inspection methods and techniques incorporated in the various parts of this European Standard. Where appropriate, adequate warning of residual hazards and the potential for misuse are given in the training and operating instructions and local to the equipment concerned (see EN 12953-7 and EN 12953-8).

It is the manufacturer's responsibility, in addition to complying with the requirements of this standard, to take into consideration special measures which could be necessary in order to achieve by manufacturing the required level of safety in accordance with the EU Directive 97/23/EC (PED).

NOTE 1 Further requirements relating to operating instructions in EN 12953-13 and to hazard analysis in CEN/TS 764-6 should be taken into consideration.

This European Standard specifies requirements for both directly fired and electrically heated boilers including Low Pressure Boilers (LPB, see 3.6) as well as for heat recovery boilers with a gas-side pressure not exceeding 0,5 bar of cylindrical design, constructed from carbon or carbon manganese steels by fusion welding and a design pressure not exceeding 40 bar. The boilers covered by this European Standard are intended for land use for providing steam or hot water (typical examples are shown in Figures 1 to 6).

For Low Pressure Boilers (LPB) less stringent requirements concerning design and calculation are acceptable. Details are defined in the respective clauses.

NOTE 2 For boilers operating at a pressure on the gas-side greater than 0,5 bar the rules of this standard equally apply. However, it is generally considered that additional design analysis, inspection and testing may be necessary.

Where a particular boiler is a combination of shell and water-tube design then the water-tube standard series EN 12952 is used in addition to this European Standard. One such example of this combination is shown in Figure 3.

This European Standard applies to the generator, from the feed-water or water inlet connection to the steam or water outlet connection and to all other connections, including the valves and steam and water fittings. If welded ends are used, the requirements specified herein begin or end at the weld where flanges, if used, would have been fitted.

1.2 Exclusions

This European standard does not apply to the following types of boilers and equipments:

a) water-tube boilers;

b) non stationary boilers, e.g. locomotive boilers;

c) thermal oil boilers;

d) boilers where the main pressure housing is made of cast material.

e) pumps, gaskets, etc.

f) brickwork setting and insulation, etc.

NOTE Stainless steel boilers are covered by EN 14222.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12953-3:2002, *Shell boilers — Part 3: Design and calculation for pressure parts*

EN 12953-10:2003, *Shell boilers — Part 10: Requirements for feedwater and boiler water quality*

EN 12953-13:2012, *Shell boilers — Part 13: Operating instructions*

CR 12953-14:2002, *Shell boilers — Part 14: Guideline for involvement of an inspection body independent of the manufacturer*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
purchaser
individual or organization that buys the boiler or part thereof from the manufacturer

3.2
manufacturer
individual or organisation that is responsible for the design, fabrication, testing, inspection, installation of pressure equipment and assemblies where relevant

[SOURCE: EN 764-3:2002]

Note 1 to entry: The manufacturer can subcontract one or more of the above mentioned tasks under its responsibility (for example, designer, installer, etc.).

3.3
material supplier
individual or organisation, that may or may not be the material manufacturer, who supplies material or parts used in the manufacture of pressure equipment and assemblies

[SOURCE: EN 764-3:2002]

Note 1 to entry: A material supplier may be a stockist.

3.4
material manufacturer
individual or organisation that produces material in the basic product forms used in the manufacture of pressure equipment

[SOURCE: EN 764-3:2002]

3.5
installer
individual or organisation that carries out the assembly of the pressure equipment at the location where it is to be put into service

Note 1 to entry: Depending on the contractual circumstances, the installer may be considered as the manufacturer of the assembly.

3.6
low pressure boilers (LPB)
steam boilers with a maximum saturation temperature of 120 °C (this corresponds to a pressure of 1 bar gauge) or hot water boilers with a maximum outlet temperature of 120 °C and a maximum allowable pressure of 10 bar gauge

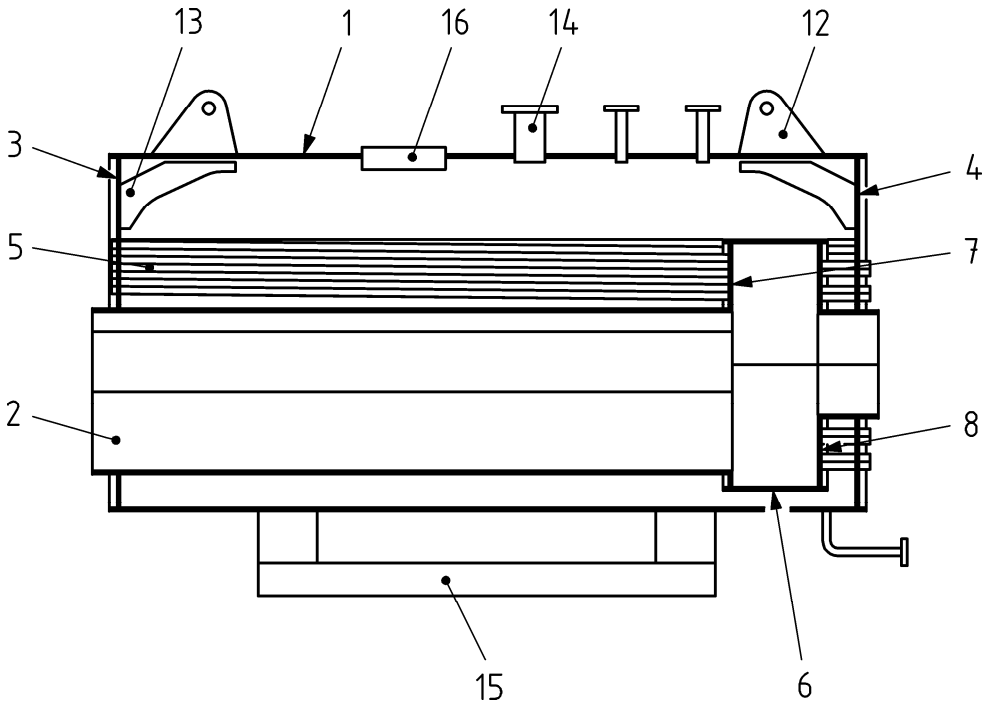
Note 1 to entry: The manufacturer may have the option of using this harmonised European Standard or alternatively EN 14394 for low pressure boilers which are to be used as hot water heating boilers.

3.7
shell boiler
closed vessel containing water in which flames and/or hot gases pass through the inside of tubes located within the shell which forms part of an assembly

Note 1 to entry: This is opposed to water-tube boiler where the water is inside the tubes and flue gas is outside the tubes.

Note 2 to entry: Figures 1 to 6 are typical configurations and examples of shell boilers. Other configurations are also permissible (e.g. vertical shell).

Note 3 to entry: Informative Annex C gives translations of some typical components of a shell boiler.

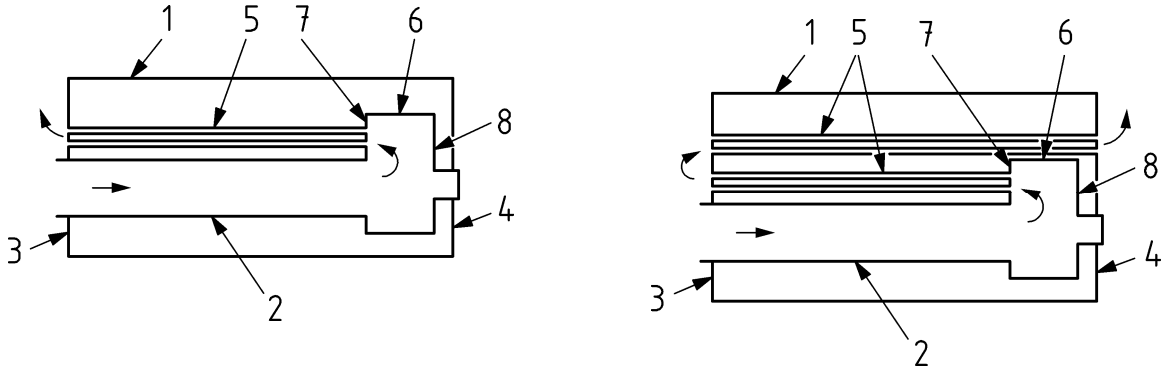


Key

1) cylindrical shell
2) furnace tube (1st pass): for example plain or corrugated or with bowling hoops
3) front tube plate (or front plate depending on the configuration)
4) rear plate (or rear tube plate depending on the configuration)
5) smoke tube(s) (2nd pass/3rd pass) (maybe with stay tubes or bar stays)
6) wrapper plate (shell of reversal chamber)
7) reversal chamber tube plate
8) wet back rear plate
12) lifting lugs
13) gusset stays
14) branches
15) supports
16) inspection opening

NOTE The main pressure-bearing parts are the parts, which constitute the envelope under pressure, and the parts which are essential for the integrity of the boiler.

Figure 1 — Typical components of a shell boiler



a) two pass boiler

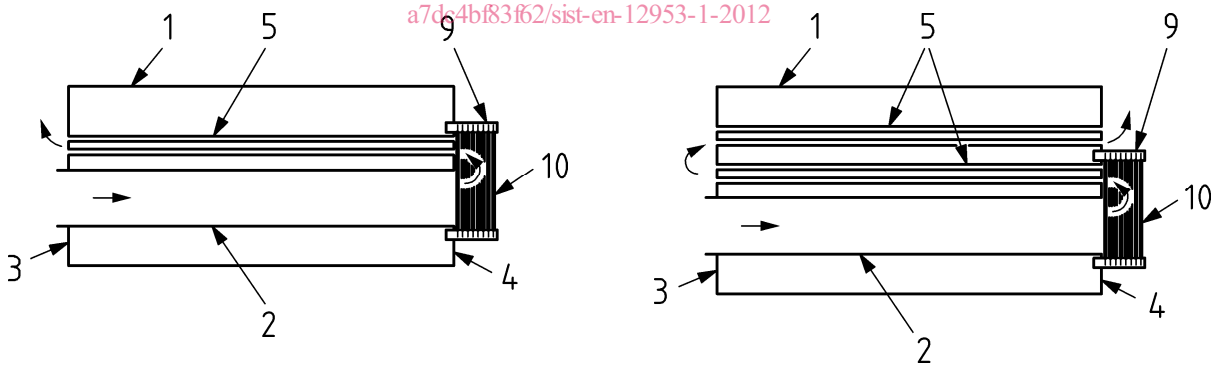
b) three pass boiler

Key

1) cylindrical shell
2) furnace tube (1st pass): for example plain or corrugated or with bowling hoops
3) front tube plate (or front plate depending on the configuration)
4) rear plate (or rear tube plate depending on the configuration)
5) smoke tube(s) (2nd pass/3rd pass) (maybe with stay tubes or bar stays)
6) wrapper plate (shell of reversal chamber)
7) reversal chamber tube plate
8) wet back rear plate

NOTE The effective radiant heating surface comprises the furnace tube and the surface of the reversal chamber, where applicable.

Figure 2 — Wet back boiler with internal reversal chamber



a) two pass boiler

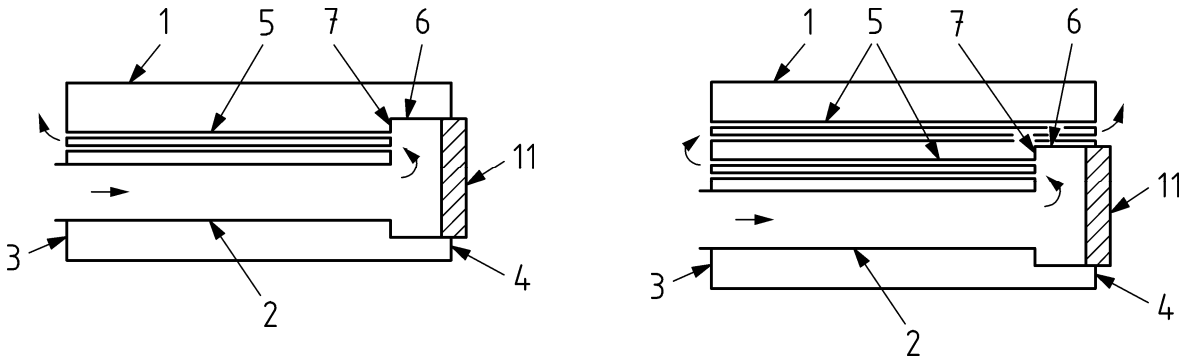
b) three pass boiler

Key

1) cylindrical shell
2) furnace tube (1st pass): for example plain or corrugated or with bowling hoops
3) front tube plate (or front plate depending on the configuration)
4) rear plate (or rear tube plate depending on the configuration)
5) smoke tube(s) (2nd pass/3rd pass) (maybe with stay tubes or bar stays)
9) header
10) membrane wall

NOTE The effective radiant heating surface comprises the furnace tube and complete surface of the reversal chamber.

Figure 3 — Wet back boiler with external reversal chamber



a) two pass boiler

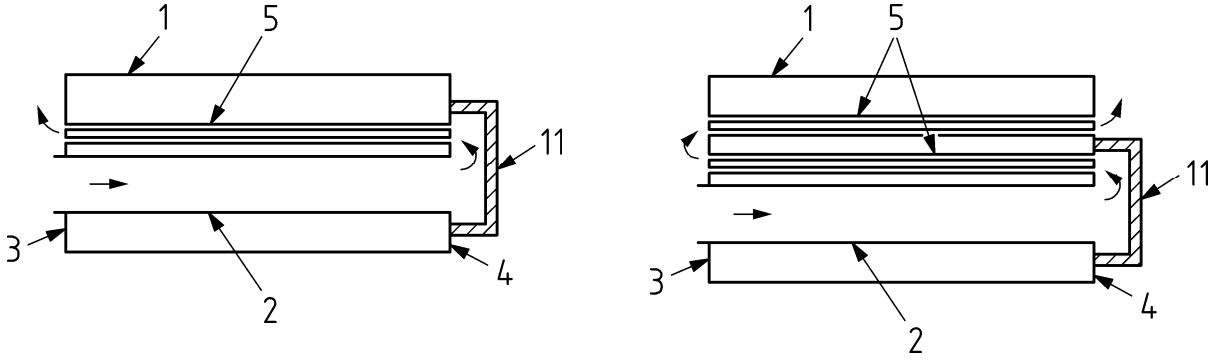
b) three pass boiler

Key

1) cylindrical shell
2) furnace tube (1st pass): for example plain or corrugated or with bowling hoops
3) front tube plate (or front plate depending on the configuration)
4) rear plate (or rear tube plate depending on the configuration)
5) smoke tube(s) (2nd pass/3rd pass) (maybe with stay tubes or bar stays)
6) wrapper plate (shell of reversal chamber)
7) reversal chamber tube plate
11) insulation: for example refractory

NOTE The effective radiant heating surface comprises the furnace tube wrapper plate and reversal chamber tube plate.

Figure 4 — Semi-wet back boiler



a) two pass boiler

b) three pass boiler

Key

1) cylindrical shell
2) furnace tube (1st pass): for example plain or corrugated or with bowling hoops
3) front tube plate (or front plate depending on the configuration)
4) rear plate (or rear tube plate depending on the configuration)
5) smoke tube(s) (2nd pass/3rd pass) (maybe with stay tubes or bars)
11) insulation: for example refractory

NOTE The effective radiant heating surface comprises the furnace tube and rear tube plate.

Figure 5 — Dry back boiler